

Perceived Benefits of Implementing and Using Hospital Information Systems and Electronic Medical Records

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Abstract. Hospital information systems (HIS) and electronic medical records (EMR) are currently considered a major part of the healthcare system, on which all the processes of care delivery depend. They have the potential to provide substantial benefits to healthcare professionals, patients and healthcare organizations. The study used quantitative survey methods through a questionnaire to collect data and information directly from different categories of healthcare professionals of four Saudi hospitals. Valid responses were 153 and ten perceived benefits were validated and ranked, these are; 1) Improved information access, 2) Increased healthcare professionals productivity, 3) Improved efficiency and accuracy of coding and billing, 4) Improved quality of healthcare, 5) Improved clinical management (diagnosis and treatment), 6) Reduced expenses associated with paper medical records, 7) Reduced medical errors, 8) Improved patient safety, 9) Improved patient outcomes and 10) Improved patient satisfaction. There is still limited data regarding the direct economic benefits of HIS & EMR.

Keywords. Hospital Information Systems, Electronic Medical Records, Perceived Benefits, Hospitals.

Introduction

Hospital information systems (HIS) and electronic medical records (EMR) are considered a major part of the healthcare system, on which all the processes of care delivery depend [1]. The importance of these systems emerges from their fundamental role in managing all patient data and information including investigations, diagnoses, treatments, follow up reports and important medical decisions [2]. HIS and EMR have the potential to provide substantial benefits to healthcare professionals, patients and organizations. They can facilitate workflow and improve the quality of patient care and patient safety [3]. Application of information technology has been identified by the Institute of Medicine as one of the principal ways to improve quality of healthcare [4]. Poor coordination of care due to information inaccessibility, as a nature of the paper based medical records, has negative consequences and contributes to higher medical costs. HIS and EMR have the potential to improve coordination of healthcare by making information electronically available and accessible at the point of care, especially if implemented widely within the organization [5]. Studies examined the

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relationship between using systems and improved accessibility of information for better coordination of healthcare activities [6]. Some EMR applications such as dictation systems and automated voice recognition, hand held bedside information technology solutions and other software innovations could enhance productivity of healthcare professionals [7]. Studies discuss the direct link between wide implementation, acceptance and use of HIS and EMR and the improved clinical management and patient outcomes, in terms of diagnosis and treatment [8]. Studies suggest improvement in quality of healthcare with the implementation and use of EMRs, although most were unable to demonstrate direct improvements in patient clinical outcomes. These studies examined the effectiveness of systems in various areas, including mainly improvement in the delivery of patient care and reduction in medication errors [9]. Computerized physician order entry has been shown also to improve patient safety by reducing adverse drug events and drug interactions [10]. EMR are widely viewed as useful tools for supporting the provision of high quality healthcare. However, the evidence of their effectiveness is mixed. Some studies tried to consider the availability and use of specific EMR features, and also tried to assess the relationship between the use of an EMR and some of its specific features with the improved quality of care [11]. Some others proved that patient satisfaction is affected by the use of computers in general and more specifically in the examination room, where patients who have experienced computers in the exam room expressed higher satisfaction [12]. A study performed a cost-benefit analysis of EMRs in ambulatory primary care settings; benefits came primarily from savings in drug expenditures, improved utilization of radiology tests, better capture of charges, and decreased billing errors when using EMRs rather than paper based records [3]. Health information technology and electronic medical records could also improve accuracy of coding and billing through better documentation and coding decision support to providers translating this into enhanced revenues [13].

1. Methods

This study used quantitative survey methods, through the development and application of a questionnaire to collect data and information directly from different categories of well-informed healthcare professionals, who already have experience with HIS and EMRs, including doctors, nurses, technicians and administrative staff of Saudi hospitals, mainly four selected hospitals, two private and two government, and then analyzed the results using SPSS software to rank and sort benefits of implementing and using HIS and EMR. The questionnaire included two sections of questions. The first section was about the participant, with some demographic information, and the second was about ten validated benefits of implementing and using HIS and EMR. The reliability and internal consistency were tested showing a high Cronbach's Alpha. The four selected hospitals were fully implementing HIS and EMR. Data were collected using systemic random methods to include 5% of the hospital staff. In this method sample members from the larger population are selected according to a random starting point and a fixed periodic interval. This sampling interval is calculated by dividing the population size by the desired sample size. Data was collected with 153 valid responses out of 300 selected participants; 51% response rate, over 6 months duration on 2016. Nurses and administrative staff showed over 60% response rate, while physicians and technicians showed less than 40%. Private hospitals showed insignificantly higher rate.

2. Results

Taking experienced opinions into consideration, the overall mean, for all participants on all of the benefits perceived when implementing and using HIS and EMRs was 4.18, which means that participants overall agree that implementing and using HIS and EMRs at their hospitals had a lot of benefits. The benefits were ranked using descending sorting as shown in Table 1.

Table 1. Evaluating and ranking benefits of implementing and using HIS and EMRs.

| Item | Mean | Participants' Opinion |
|--|------|-----------------------|
| Improved information access | 4.49 | Strongly Agree |
| Increased healthcare professionals productivity | 4.31 | Strongly Agree |
| Improved efficiency and accuracy of coding and billing | 4.30 | Strongly Agree |
| Improved quality of healthcare | 4.27 | Strongly Agree |
| Improved clinical management (diagnosis and treatment) | 4.22 | Strongly Agree |
| Reduced expenses associated with paper medical records | 4.13 | Agree |
| Reduced medical errors | 4.05 | Agree |
| Improved patient safety | 4.05 | Agree |
| Improved patient outcomes | 4.01 | Agree |
| Improved patient satisfaction | 3.95 | Agree |

3. Discussion and Conclusion

The most important perceived benefit of implementing HIS and EMRs was the improved information access. Consistently, in their study, O'Malley and her colleagues identified six ways in which such systems could facilitate information accessibility and coordination of care; improving access to data during patient encounters, improving processes workflow, managing information overflow to clinicians, enhancing medical decision-making process care plans, supporting operational processes and improving financial data accessibility [6]. HIS and EMR can also decrease costs of some services such as medical transcription and reporting, making the work of healthcare professionals more productive [7]. They also have the potential to support better randomized trials by identifying larger numbers of eligible patients [14]. It is well documented that the use of computerized physician order entry with decision support as integrated parts of the implemented electronic medical record systems could have a role in reducing the number of medication errors [15]. Patient safety has many other dimensions than medication errors; that include reporting, analysis, and prevention of other types of medical errors. The adoption and use of health information technology could enhance the process of identifying, reporting and analyzing medical errors, so they could be easily avoided in the future not to occur with the same patient or with others [16]. Some studies examined the extent of EMR usage and how the quality of care delivered in the different healthcare practices varied according to duration of EMR implemented and used [17]. Physicians received higher overall patient satisfaction rates when a computer was used to retrieve patient information and also received similar satisfaction rates when a computer was used to enter patient information [18]. There is

still limited data regarding the direct economic benefits of EMR to an institution. This type of evidence is especially difficult to obtain because the majority of healthcare organizations cite lack of funding as the most common constraint in implementing clinical information technology solutions like an EMR [19]. We still need to do more studies on the direct and indirect benefits of developing, implementing and using HIS and EMR, since this study didn't include evaluating the influence of implementing HIS and EMRs through a pre-and-post implementation objective impact analysis.

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